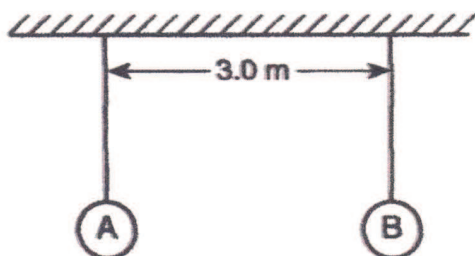


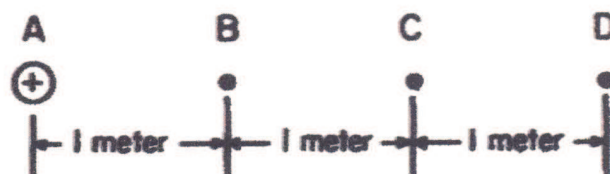
13. The diagram below shows two metal spheres suspended by strings and separated by a distance of 3.0 meters. The charge on sphere A is $+5.0 \times 10^{-4}$ coulomb and the charge on sphere B is $+3.0 \times 10^{-5}$ coulomb.



Which statement best describes the electrical force between the spheres?

- (1) It has a magnitude of 15 N and is repulsive.
 - (2) It has a magnitude of 45 N and is repulsive.
 - (3) It has a magnitude of 15 N and is attractive.
 - (4) It has a magnitude of 45 N and is attractive.
14. The electrical force of attraction between two point charges is F . The charge on one of the objects is quadrupled and the charge on the other object is doubled. The new force between the objects is
- (1) $6F$
 - (2) $2F$
 - (3) $\frac{1}{2}F$
 - (4) $8F$

Base your answers for questions 15 and 16 on the diagram below which shows a positive point charge placed at A.

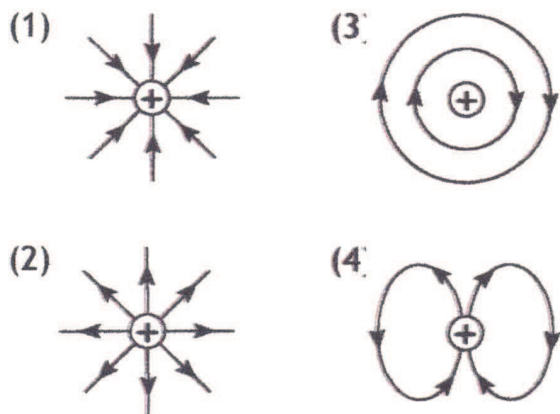


15. If the charge is moved from point B to point C, the force between the two charges will
- (1) decrease
 - (2) increase
 - (3) remain the same
16. The electric field intensity at point B is E . At point D the field intensity will be equal to
- (1) $\frac{1}{9} E$
 - (2) $\frac{1}{3} E$
 - (3) $3E$
 - (4) $9E$
17. If the charge on each of two point sources is doubled, the electrostatic force between them
- (1) remains the same
 - (2) is one-half as great
 - (3) is twice as great
 - (4) is four times as great

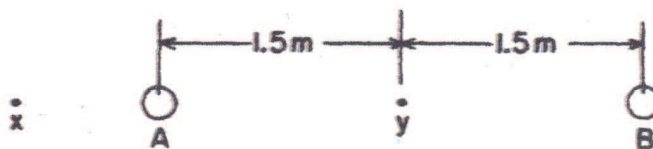
18. If the magnitude of the charge on each of two positively charged objects is halved, the electrostatic force between the objects will

- (1) decrease to one-half
- (2) decrease to one-quarter
- (3) decrease to one-sixteenth
- (4) remain the same

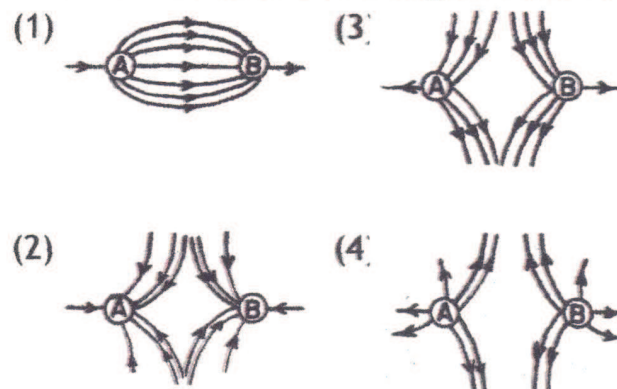
19. Which diagram best represents the electric field near a positively charged conducting sphere?



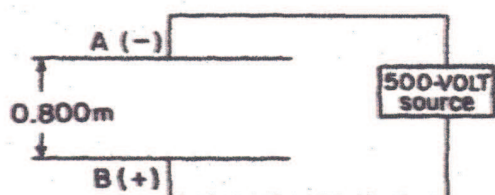
20. Base your answer on the diagram below which represents two small charged spheres, A and B, 3 meters apart. Each sphere has a charge of $+2.0 \times 10^{-6}\text{C}$.



Which diagram best illustrates the electric field between charges A and B?

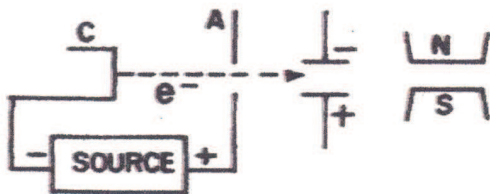


21. Base your answer on the diagram below which shows two parallel metal plates A and B connected to a voltage source.



If only the distance between the plates is increased, the electric field intensity between the plates will

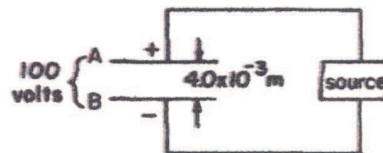
- (1) decrease (3) remain the same
(2) increase
22. Base your answer on the diagram below which represents an electron beam in a vacuum. The beam is emitted by cathode C, accelerated by anode A, and passes through electric and magnetic fields.



In which direction will the electron beam be deflected by the electric field?

- (1) into the page
(2) out of the page
(3) toward the top of the page
(4) toward the bottom of the page

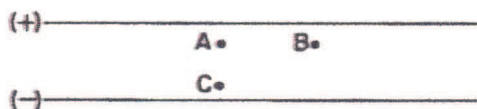
23. Base your answer on the diagram below which shows two large parallel metal plates connected to a source of electric potential. The plates are 4.0×10^{-3} meter apart and the potential difference across the plates is 100 volts.



If the distance between the plates were to decrease with the potential difference remaining constant, the magnitude of the field intensity would

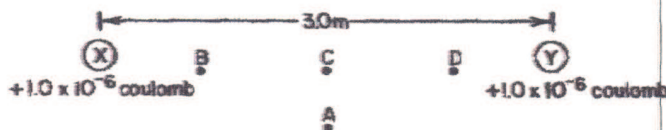
- (1) decrease (3) remain the same
(2) increase
24. As the electric charge on the surface of a hollow metal sphere increases, the electric field intensity inside the sphere
- (1) decreases
(2) increases
(3) remains the same

25. Base your answer on the accompanying diagram which represents two large parallel plates which are oppositely charged. A, B, and C are reference points.



If an electron moves from point A to point B, the electron's electric potential energy will

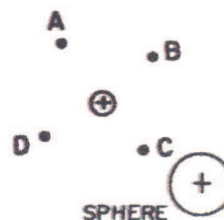
- (1) decrease (3) remain the same
(2) increase
26. Base your answer on the diagram below which represents two charged spheres, X and Y.



Moving the two spheres toward each other would cause their electrical potential energy to

- (1) decrease (3) remain the same
(2) increase

27. The diagram below represents a positive test charge located near a positively charged sphere.



The greatest increase in the electric potential energy of the test charge relative to the sphere would be caused by moving the charge to point

- (1) A (3) C
(2) B (4) D
28. Moving +2.0 coulombs of charge from infinity to point P in an electric field requires 8.0 joules of work. What is the electric potential at point P?
- (1) 0.25 V (3) 16 V
(2) 8.0 V (4) 4.0 V
29. Moving 2.0 coulombs of charge a distance of 6.0 meters from point A to point B within an electric field requires a 5.0-newton force. What is the electric potential difference between points A and B?

- (1) 60. V (3) 15 V
(2) 30. V (4) 2.5 V